WHAT IS CLAIMED:

1. A magnetic alignment apparatus for aligning a shaft of a scraped-surface heat exchanger, comprising:

a stator having a plurality of electromagnetic elements;

a rotor attached to the shaft, the rotor rotating within the stator and defining an inner cavity through which food product flows;

a sensor for detecting a position of the rotor; and

a control circuit in communication with the sensor and the electromagnetic elements, wherein the control circuit monitors the position of the rotor with data from the sensor and changes a state of one or more electromagnetic elements to adjust the rotor position.

2. The apparatus of claim 1, wherein the stator includes eight electromagnetic elements.

3. The apparatus of claim 1, wherein a pair of electromagnetic elements.

4. The apparatus of claim 3, wherein the pair includes two adjacent electromagnetic elements.

5. The apparatus of claim 1, wherein the pair includes two non-adjacent electromagnetic elements.

6. The apparatus of claim 1, wherein the state of the one or more electromagnetic elements is changed periodically.

7. The apparatus of claim 1, wherein the state of the one or more electromagnetic elements is changed non-periodically.

8. The apparatus of claim 1, wherein the plurality of electromagnetic elements comprises a plurality of solenoids.

9. The apparatus of claim 1, wherein the stator has a generally cylindrical shape.

10. The apparatus of claim 1, wherein the stator has a conical shape.

11. The apparatus of claim 1, wherein an outer surface of the rotor can be magnetized with different polarities.

12. The apparatus of claim 1, wherein the rotor comprises a magnetizable stainless steel rotor.

13. The apparatus of claim 1, wherein the rotor can be permanently magnetized.

14. The system of claim 1, wherein the rotor can be temporarily magnetized.

15. The apparatus of claim 1, the rotor comprising:

an end member;

a first annular member proximate the end member;

a second annular member proximate the first annular member; and

wherein the inner cavity extends through the first and second annular members.

16. The apparatus of claim 15, wherein a food product exits the rotor through an aperture defined between the end member and the first annular member.

17. The apparatus of claim 15, wherein the food product exits the rotor through an aperture defined between the first and second annular members.

18. The apparatus of claim 15, further comprising a third annular member proximate the second annular member.

19. The apparatus of claim 18, wherein the food product exits the rotor through an aperture defined between the second and third annular members.

20. The apparatus of claim 15, the end member comprising a conical end member.

21. The apparatus of claim 1, wherein the rotor is generally cylindrical.

22. The apparatus of claim 1, wherein the rotor has a conical shape.

23. The apparatus of claim 1, further comprising a support bearing, wherein the rotor rests on the support bearing when the rotor is at rest.

24. The apparatus of claim 23, the rotor including an end cap, a first annular member proximate the end cap, and a second annular member proximate the first annular member, wherein the first annular member rests on the support bearing.

25. The apparatus of claim 23, the rotor including an end cap, a first annular member proximate the end cap, and a second annular member proximate the first annular member, wherein the second annular member rests on the support bearing.

26. The apparatus of claim 23, further comprising a second support bearing, wherein the rotor rests on the first and second support bearings.

27. The apparatus of claim 26, the rotor including an end cap, a first annular member proximate the end cap, a second annular member proximate the first annular member, and a third annular member proximate the second annular member, wherein the first and third annular members rest on the first and second support bearings respectively.

28. The apparatus of claim 23, wherein the sensor is inserted into the support bearing.

29. The apparatus of claim 1, further comprising a generally cylindrical member surrounding a portion of the rotor, wherein the food product passes between an inner surface of the cylindrical member and an exterior surface of the portion of the rotor.

30. The apparatus of claim 29, wherein the cylindrical member is corrugated and defines a plurality of channels, wherein the food product flows within the channels.

31. The apparatus of claim 30, wherein the channels extend upward between the plurality of electromagnetic elements.

32. The apparatus of claim 29, wherein the rotor includes a first annular member, a second annular member proximate the first annular member, a third annular member proximate the second annular member, and the cylindrical member is placed around the second annular member.

33. The apparatus of claim 29, wherein the cylindrical member is placed between the stator and the rotor.

34. The apparatus of claim 1, wherein the rotor is radially adjusted.

35. The apparatus of claim 1, wherein the rotor is axially adjusted.

36. The apparatus of claim 1, wherein the rotor is temporarily magnetized, and electromagnetic members and the rotor are attracted to each other to adjust the rotor position.

37. The apparatus of claim 1, wherein the rotor is permanently magnetized, and electromagnetic members and the rotor are attracted to each other or repelled by each other to adjust the rotor position.

38. The apparatus of claim 1, wherein the rotor position is maintained within a range of about $\pm$ 1 micrometer.

39. The apparatus of claim 1, wherein the shaft is connected between non-drive and drive ends of the heat exchanger, and wherein the position of the non-drive end is adjusted.

40. The apparatus of claim 1, wherein the shaft is connected between non-drive and drive ends of the heat exchanger, and wherein the position of the drive end is adjusted.

41. The apparatus of claim 1, further comprising an axial support member, the axial support member being attached to an end of the rotor.

42. The apparatus of claim 41, wherein the axial support member is attached to a non-drive end of the heat exchanger.

43. The apparatus of claim 41, wherein the axial support member includes

a fixed outer support,

a rotatable inner member that is attached to the end of the rotor, and

a rotatable cage between the fixed outer support and the rotatable inner member.

44. The apparatus of claim 43, wherein the rotatable cage defines a plurality of housings, wherein each housing holds a bearing.

45. The apparatus of claim 41, wherein the rotor can be magnetically radially aligned.

46. The apparatus of claim 1, wherein the heat exchanger includes a non-drive end and a drive end, the shaft being connected between the non-drive and drive ends, further comprising a motor to drive the shaft.

47. The apparatus of claim 46, the motor comprising a brushless motor.

48. The apparatus of claim 1, wherein the one or more solenoids are activated to adjust the position of the rotor.

49. The apparatus of claim 1, wherein the one or more solenoids are de-activated to adjust the position of the rotor.

50. A magnetic alignment apparatus for a scraped-surface heat exchanger, comprising:

a stator having a plurality of solenoids; and

a rotor that rotates between the solenoids, the rotor defining an inner cavity through which a food product flows and having an outer surface that can be magnetized, wherein a state of one or more solenoids is changed to dynamically align the rotor using a magnetic field through the stator and the rotor.

51. The apparatus of claim 50, the rotor comprising:

a generally conical end member;

a first annular member proximate the generally conical end member;

a second annular member proximate the first annular member; and

a third annular member proximate the second annular member, wherein the inner cavity extends through the first, second and third annular members.

52. The apparatus of claim 50, further comprising a support bearing, wherein a stationary rotor rests on the support bearing.

53. The apparatus of claim 52, further comprising a sensor that detects a position of the rotor through the support bearing.

54. The apparatus of claim 50, further comprising a corrugated member surrounding the rotor, wherein the food product passes between an inner surface of the corrugated member and an outer surface of the rotor.

55. The apparatus of claim 50, wherein the outer surface of the rotor is temporarily magnetized.

56. The apparatus of claim 50, wherein the rotor has a conical shape.

57. The apparatus of claim 50, wherein a non-drive end of the heat exchanger is adjusted.

58. The apparatus of claim 50, wherein a drive end of the heat exchanger is adjusted.

59. A method of magnetically aligning a shaft of a scraped-surface heat exchanger, comprising:

detecting a position of a rotor, the rotor being attached to the shaft, the rotor rotating within a stator;

comparing a detected position of the rotor to a predetermined range of positions; if the detected position falls outside the predetermined range,

adjusting the position of the rotor by changing a state of one or more solenoids in the stator so that a magnetic field through the solenoids and the rotor changes the position of the rotor.

60. The method of claim 59, wherein the rotor is temporarily magnetized, and adjusting the position of the rotor further comprises attracting the rotor towards the solenoids.

61. The method of claim 59, wherein the rotor is permanently magnetized, and adjusting the position of the rotor further comprises repelling the rotor away from the solenoids.

62. The method of claim 59, wherein the rotor is permanently magnetized, and adjusting the position of the rotor further comprises attracting the rotor towards the solenoids.

63. The method of claim 59, further comprising providing one or more support bearings, wherein the rotor rests on the one or more support bearings when the rotor is at rest.

64. The method of claim 59, wherein adjusting the position further comprises adjusting a radial position.

65. The method of claim 59, wherein adjusting the position further comprises adjusting an axial position.

66. The method of claim 59, wherein the rotor comprises a in a non-drive end of the heat exchanger.

67. The method of claim 59, wherein the rotor comprises a rotor in a drive end of the heat exchanger.

68. The method of claim 59, wherein adjusting the position of the rotor by changing the state of the one or more solenoids further comprises activating the one or more solenoids.

69. The method of claim 59, wherein adjusting the position of the rotor by changing the state of one or more solenoids further comprises de-activating the one or more solenoids.

70. A method of aligning a shaft of a scraped-surface heat exchanger while processing a food product, comprising:

providing a food product within the rotor;

rotating the rotor within a stator using a motor, the rotor being attached to the shaft;

detecting a position of the rotor;

comparing the detected position to a predetermined range of positions; and if the detected position does fall outside the predetermined range,

adjusting the position of the rotor by activating or de-activating one or more solenoids in the stator so that a magnetic field completed through the activated solenoid and the rotor changes the position of the rotor.

71. The method of claim 70, wherein the rotor is temporarily magnetized, and adjusting the position of the rotor further comprises attracting the rotor towards the solenoids.

72. The method of claim 70, wherein the rotor comprises a generally conical end member, a first annular member proximate the generally conical end member, a second annular member proximate the first annular member, and a third annular member proximate the second annular member, wherein an inner cavity extending through the first, second and third annular members.

73. The method of claim 70, further comprising expelling a majority of the food product through an aperture defined between the generally conical end member and the first inner member.

74. The method of claim 70, further comprising expelling a portion of the food product through an aperture defined between the first inner member and the second inner member.

75. The method of claim 70, further comprising expelling a portion of the food product through an aperture defined between the second inner member and the third inner member.

76. The method of claim 70, further comprising expelling the food product through an aperture defined between a top surface of the rotor and an interior surface of a corrugated enclosure surrounding a portion of the rotor.

77. The method of claim 70, further comprising

removing power from the rotor so that the rotor does not rotate; and

providing a support upon which the rotor rests.

78. The method claim 70, wherein adjusting the position further comprises adjusting a radial position.

79. The method of claim 70, wherein adjusting the position further comprises adjusting an axial position.

80. The method of claim 70, wherein the rotor comprises a non-drive end rotor.

81. The method of claim 70, wherein the rotor comprises a drive end rotor.